

CE CIT UOB
ITCE471 (DSP)

Test 1

Time: 1 hour

Date: 30 Oct, 2013

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Q1 [20 marks]

The following analog signal, where t is in seconds:

$$x(t) = 3 + \sin(0.2\pi t) + \sin(0.4\pi t) + \sin(0.5\pi t)$$

- a) Is $x(t)$ periodic? If no, why? If yes find the fundamental period.
- b) Suggest a suitable sampling frequency to digitize the above analog signal and write its $x[n]$ equation.

Q2 [20 marks]

Find **IDFT** of the following causal system:

$$\mathbf{H(k)} = \{-1, 1, -1, -1\}$$

Q3 [30 marks]

Plot the frequency response of the following system:

$$\mathbf{h[n] = 2 \, (-1/4)^n \, u[n]}$$

Q4 [30 marks]

If $\mathbf{x[n]} = \{ 2 \ -1 \ 3 \}$ and $\mathbf{h[n]} = (0.5)^n \mathbf{u[n]}$, find $\mathbf{y[n]}$ at $n = -1, 0, 1, 2, 3, 4$ and 5